

LOW VOLTAGE NBFM IF SYSTEM

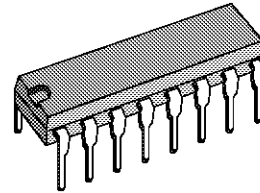
- OPERATION FROM 1.8V TO 9V
- LOW DRAIN CURRENT (4mA, $V_s = 4V$)
- HIGH SENSITIVITY
(-3dB input limiting at 3 μ V)
- 8 μ V INPUT FOR 20dB S/N
- LOW EXTERNAL FAIR COUNT

DESCRIPTION

The TDA7361 is a low-power narrow band FM IF demodulation system operable to less than 2 V supply voltage.

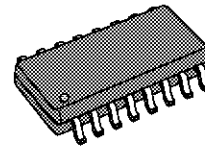
The device includes Oscillator, Mixer, Limiting Amplifier, Quadrature Discriminator, Op. Amp. Squelch, Scan Control and Mute Switch.

The TDA7361 is designed for use in NBFM dual conversion communication equipments using a 455 KHz ceramic filter like cordless telephones, walkie-talkies, scan receivers, etc.



DIP16

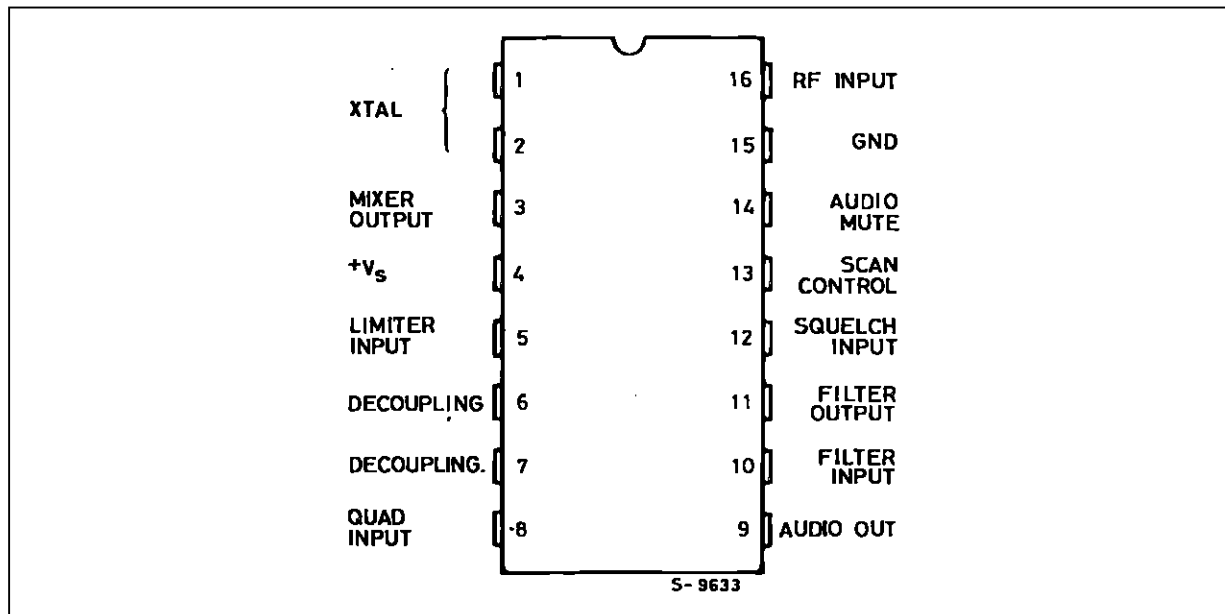
ORDERING NUMBER : TDA7361



SO16

ORDERING NUMBER : TDA7361D

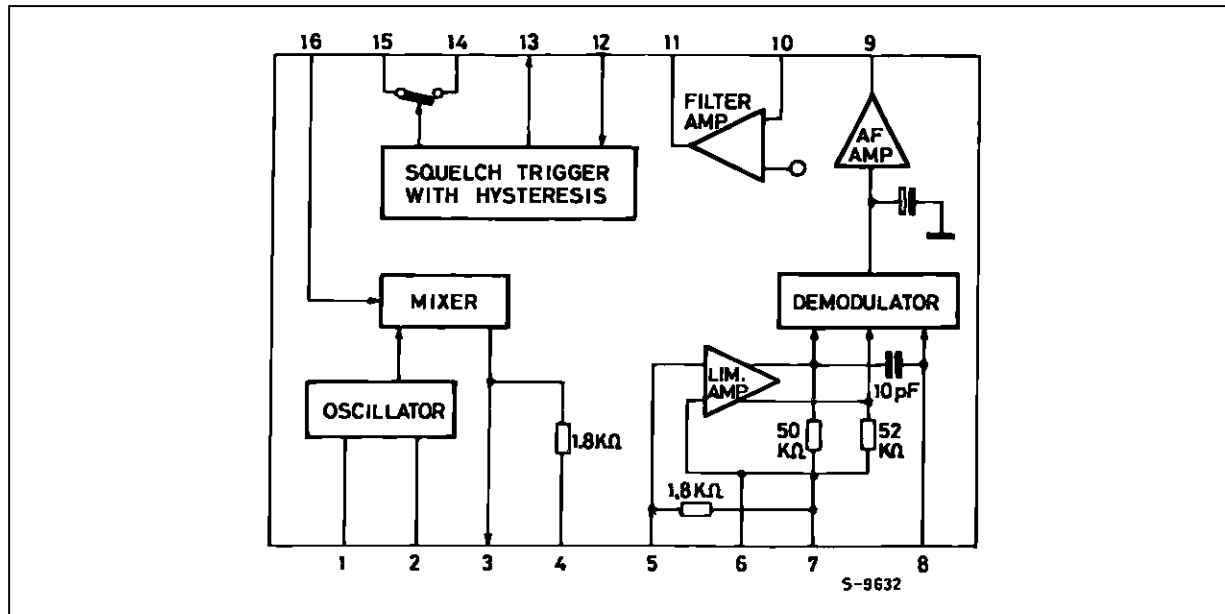
PIN CONNECTION



Pin FUNCTION

No	Name	Function
1-2	XTAL OSCILLATOR	Connections for the Colpitts XTAL Oscillator. The XTAL may be replaced by an inductor (see Figure 5) if the application does not require high stability.
3	MIXER OUT	The Mixer is double balanced to reduce spurious products. The output impedance is $1.8k\Omega$ to match the input impedance of a 455kHz ceramic filter.
4	SUPPLY VOLTAGE	Must be well decoupled with a 100nF ceramic capacitor.
5	IF LIMITER INPUT	Input pin of the six stages amplifier with about $50\mu V$ limiting sensitivity and $1.8k\Omega$ input impedance. The if output is connected to the external quadrature coil (Pin 8) via an internal 10pF capacitor.
6-7	DECOUPLING	Good quality 100nF ceramic capacitors and a suitable layout are important.
8	QUADRATURE COIL	A quadrature detector is used to demodulate the 455kHz FM signal. The Q of the quad coil has direct effect on output level and distortion (see Figure 6). For proper operation the voltage should be $100mV_{RMS}$.
9	AUDIO OUTPUT SIGNAL	The audio output signal is buffered by an internal emitter follower.
10	OPERATIONAL AMPLIFIER INPUT	Because of the low DC bias, the swing on the operational amplifier output is limited to $500mV_{RMS}$.
11	OPERATIONAL AMPLIFIER OUTPUT	This can be increased by adding a resistor from the operational amplifier input to ground.
12	SQUELCH INPUT	The squelch trigger circuit with a low bias on the input (Pin 12) will force Pin 13 high ; and Pin 14 low.
13	SCAN CONTROL	Pulling Pin 12 above mute threshold (0.65V) will force Pin 13 to an impedance of about $60k\Omega$ to ground and Pin 14 will be an open circuit.
14	MUTE	An hysteresis of about 50mV at Pin 12 will effectively prevent jitter.
15	GND	Ground Connection
16	10.7MHz MIXER INPUT	Input of the Wide-band Mixer. Normally used as 10MHz/455kHz converter, it can be also used with input frequencies up to 60MHz.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage	9	V
V_I	RF Input Voltage (Pin 16)	1	V _{RMS}
V_8	Detector Input Voltage	1	V _{PP}
V_{14}	Mute Function Voltage	- 0.5 to +5	V
T_{oper}	Operating Ambient Temperature	0 to 70	°C
T_{stg}	Storage Temperature	- 65, + 150	°C

THERMAL DATA

Symbol	Parameter	SO16	DIP16	Unit
$R_{th\ j-amb}$	Junction-ambient Thermal Resistance	Max. 200	100	°C/W

ELECTRICAL CHARACTERISTICS

$T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		1.8	4	9	V
I_S	Supply Current	Squelch OFF Squelch ON		3.8 4.7		mA mA
V_I	Input Quieting Voltage	S/N = 20dB		8		μV
V_I	Input Limiting Voltage	- 3dB limiting		3		μV
V_O	Recovered Audio Output	$V_I = 10\text{mV}$		150		mV _{RMS}
V_9	Detector Output Voltage			1.5		V _{DC}
R_9	Detector Output Impedance			400		Ω
	Detector Center Frequency Slope			150		mV/kHz
G_V	Operational Amplifier Gain	$f = 10\text{kHz}$, $G_V = V_{11}/V_{10}$	40	55		dB
V_{11}	Operational Amplifier Output Voltage			1.5		V _{DC}
I_B	Operational Amplifier Input Bias Current	Pin 10		20		nA
V_T	Trigger Hysteresis			50		mV
R_m	Mute Switching Impedance	Low High		50 10		Ω MΩ
V_{13}	Scan Voltage	Pin 12 High (2V) Pin 12 Low (0V)	3.0	0 3.4	0.5	V _{DC} V _{DC}
G_C	Mixer Converter Gain			30		dB
R_I	Input Resistance			3.3		kΩ
C_I	Input Capacitance			2.2		pF

Figure 2 : Test Circuit

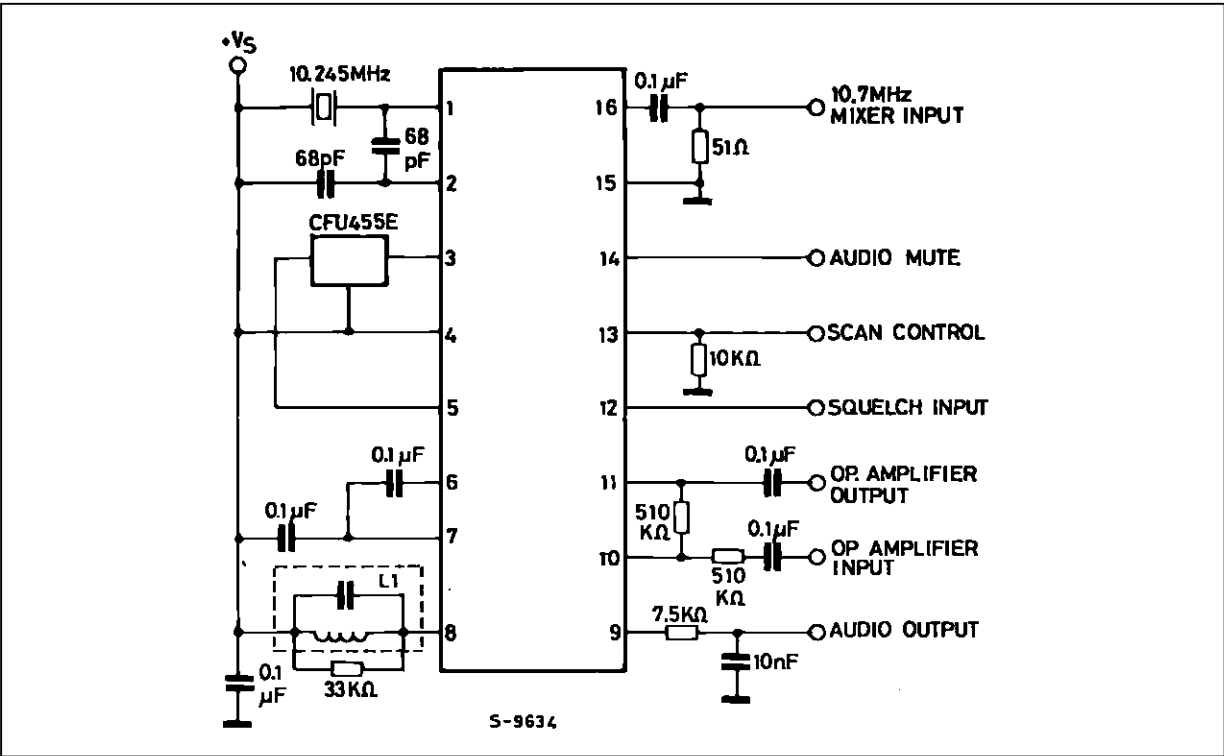


Figure 3 : Supply Current versus Supply Voltage

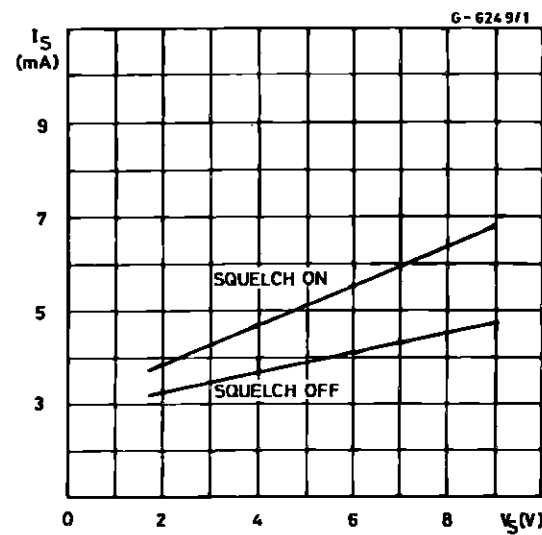


Figure 4 : FM IF Characteristics

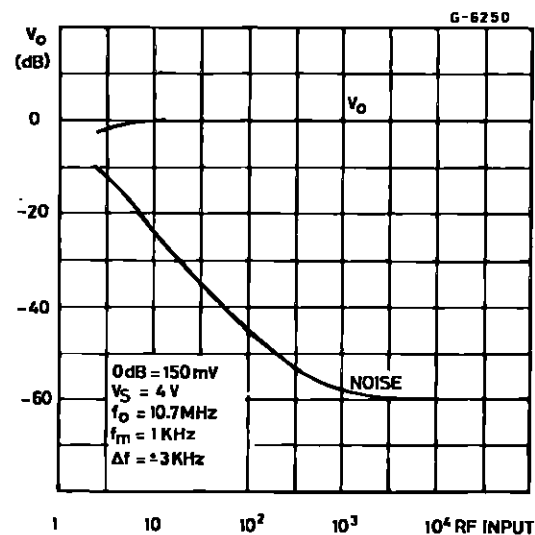


Figure 5 : Colpitts XTAL Oscillator

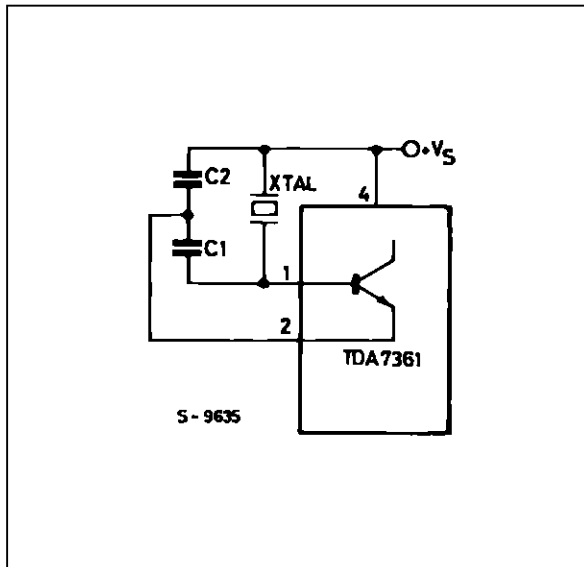


Figure 6 : Effect of Quadrature Coil "Q" on Audio Level and Distortion

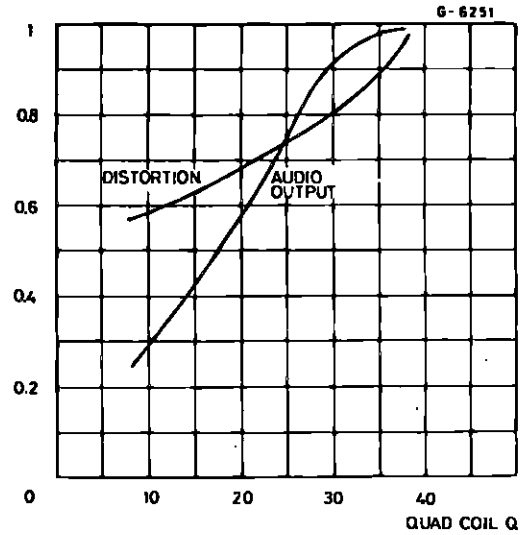
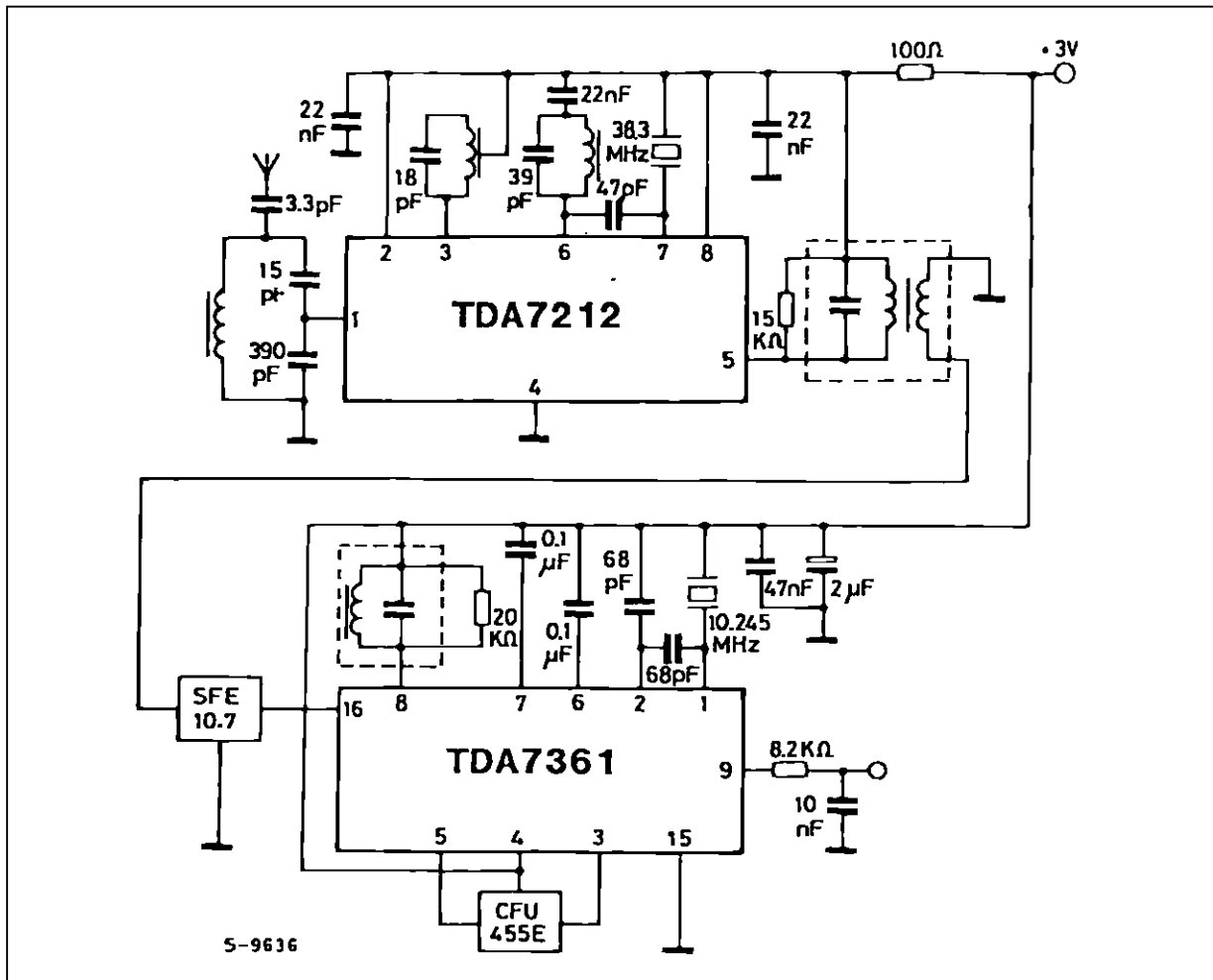
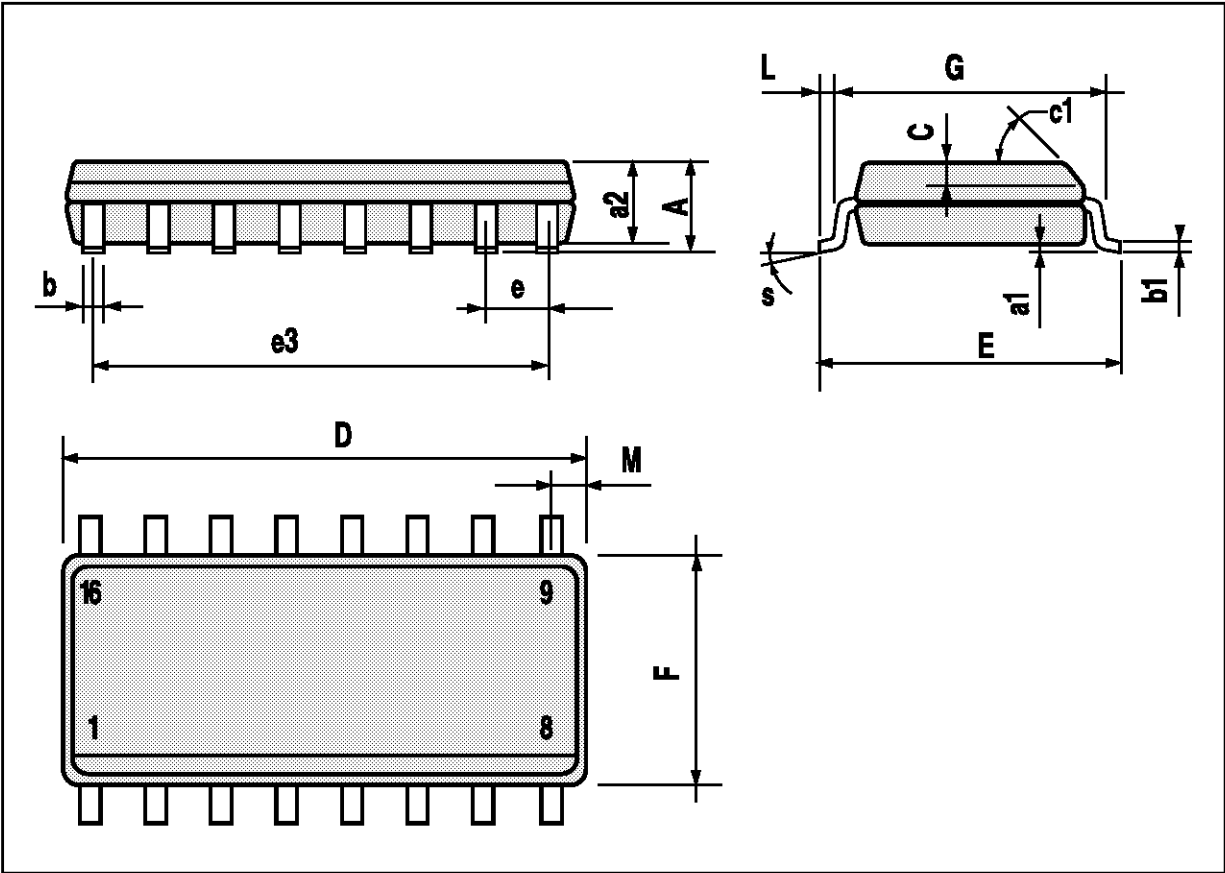


Figure 7 : Application Information (49MHz cordless receiver)



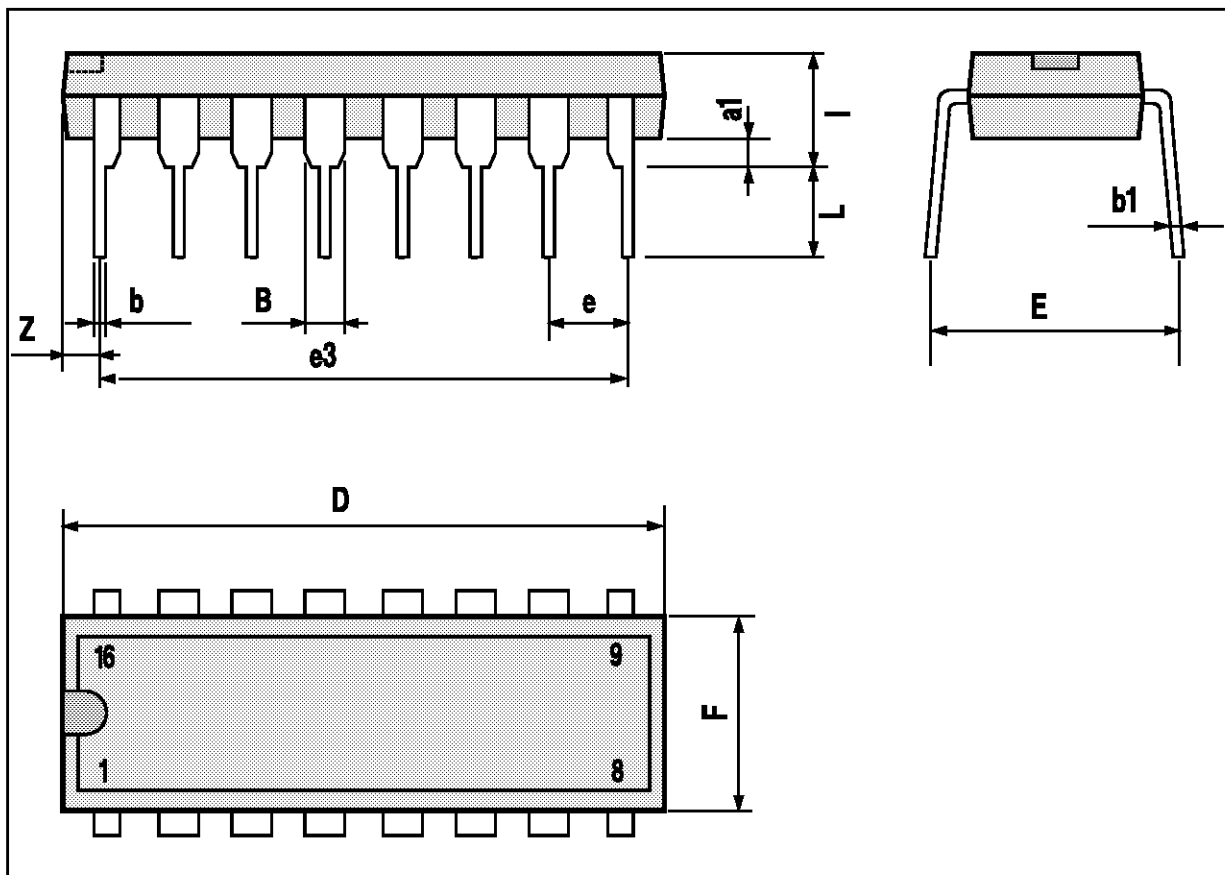
SO16 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.009
a2			1.6			0.063
b	0.35		0.46	0.014		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.020	
c1	45 (typ.)					
D	9.8		10	0.386		0.394
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.62			0.024
S	8 (max.)					



DIP16 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



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